Z Vertex Bias

Symptom: A loss of vertex location efficiency as a function of *z*, with efficiency highest at downstream end of each emulsion module

This effect is seen in all hybrid emulsion experiments using thick emulsion targets

E653, CHORUS, DONUT...

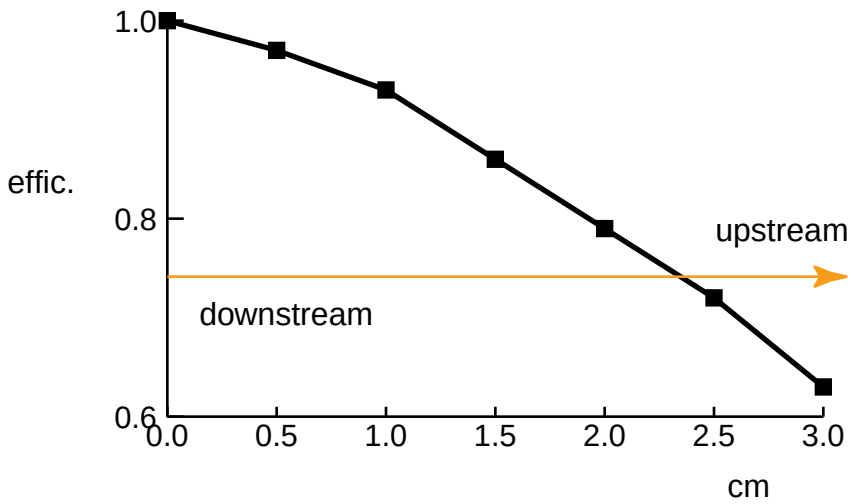
Cause: Vertex predictions fail in thick targets due to showering, 2^{ry} interactions, scattering...

$\Rightarrow$ Primary Interaction will be difficult to locate. Method of location probably makes a difference, in principle

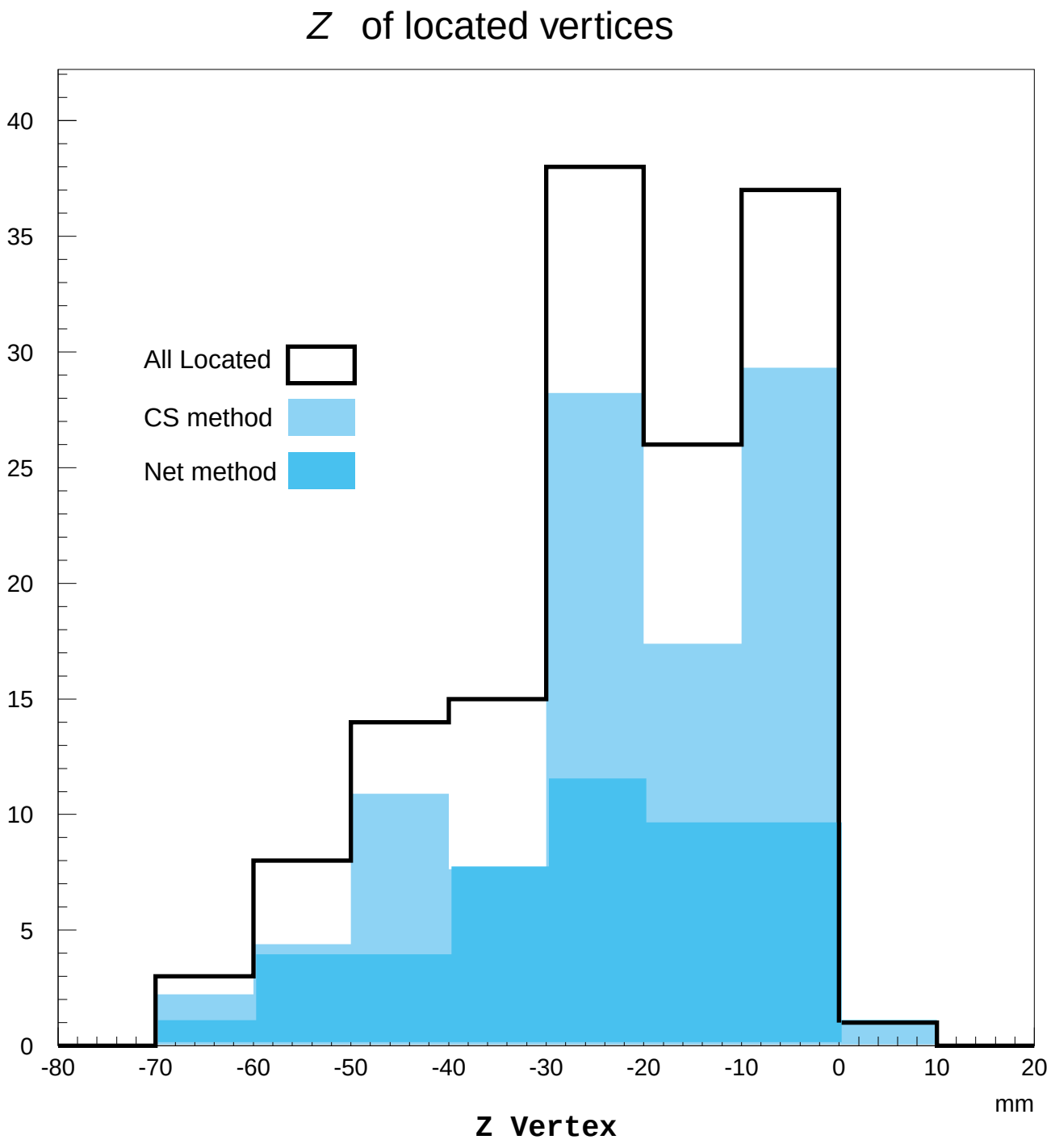
Z Vertex Bias

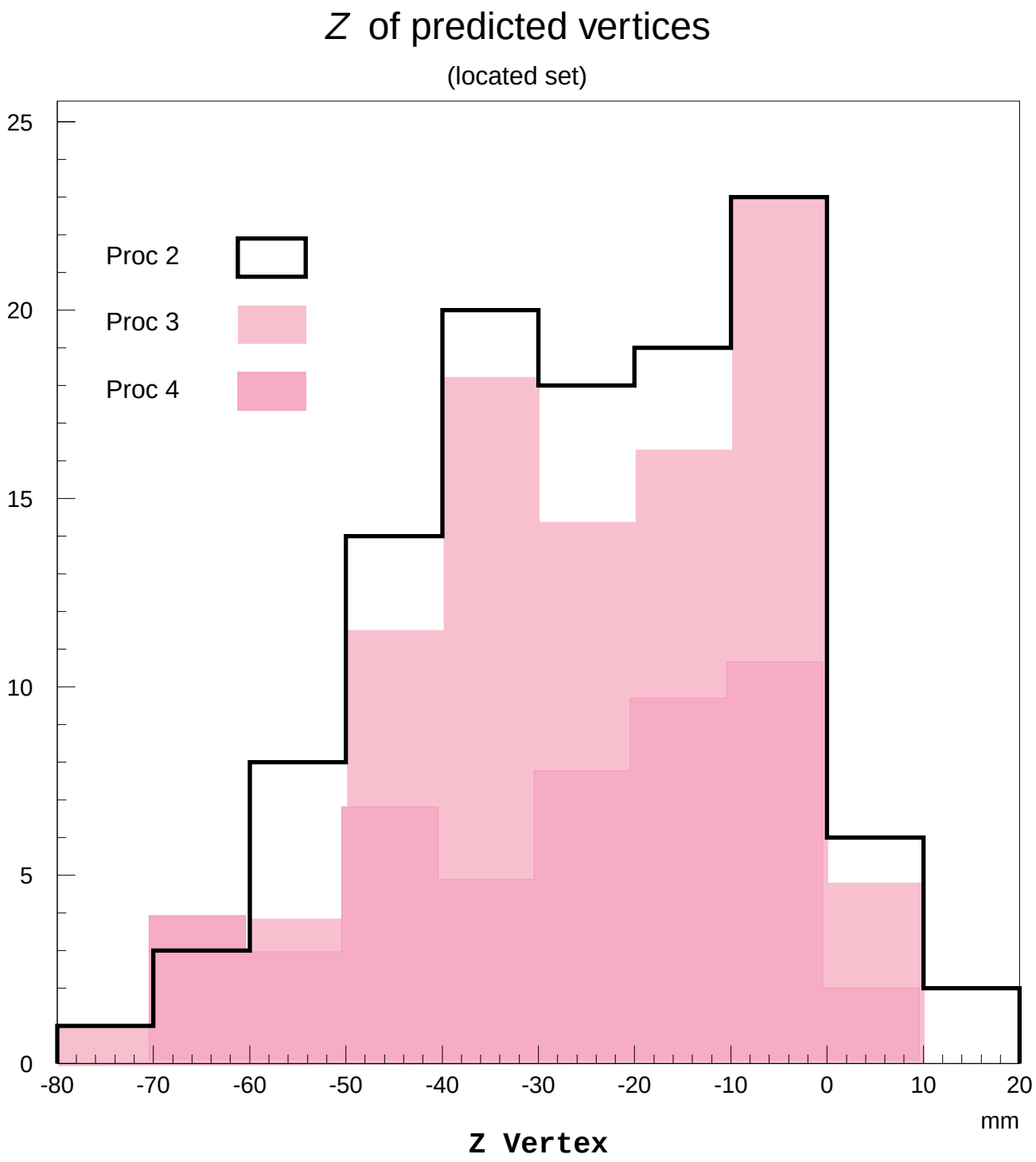
For DONUT, this loss of efficiency is relatively severe, since our 6cm targets are the thickest ever used in a hybrid spectrometer (relying on electronic vertex predictions)

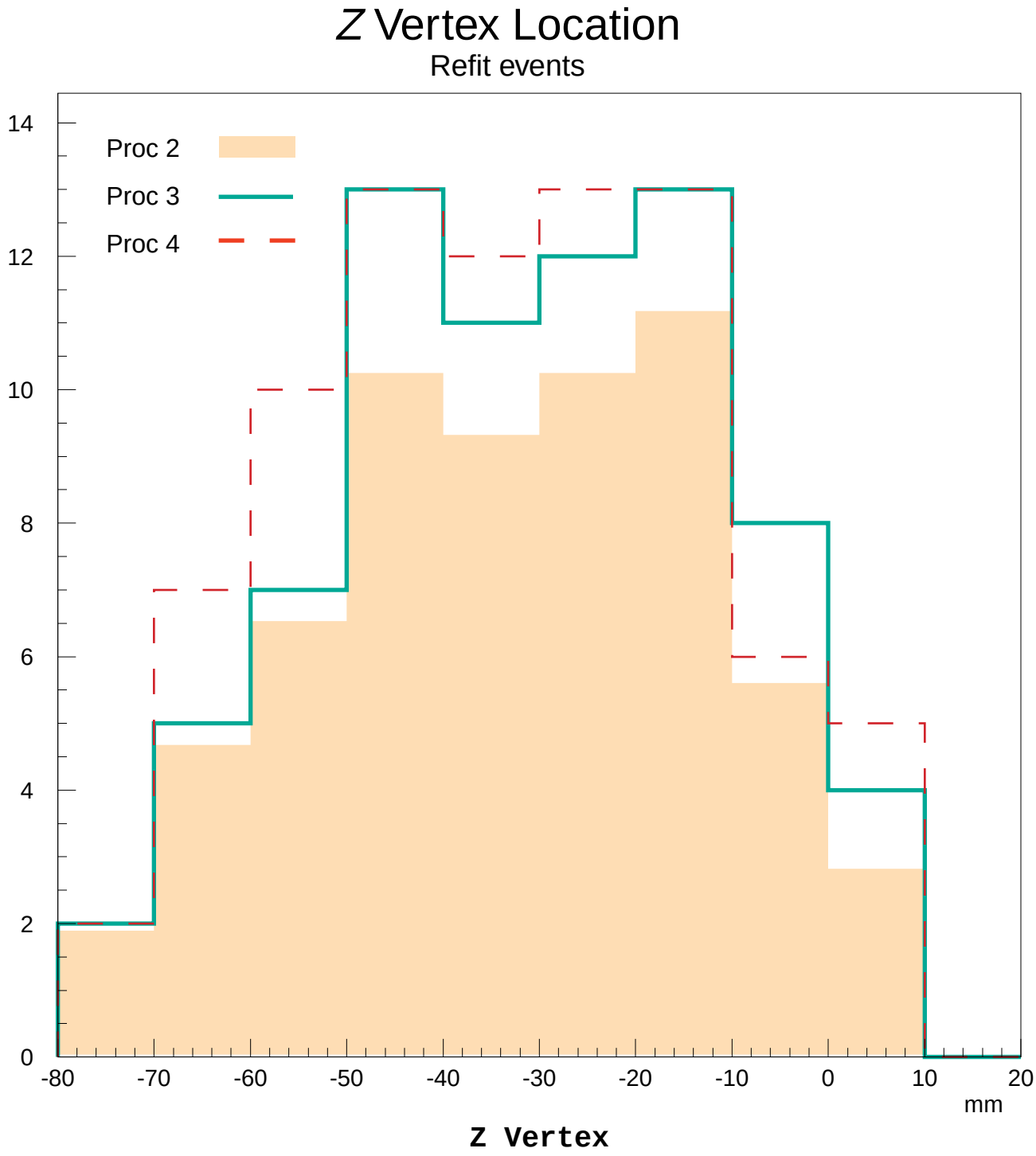
Extrapolating from CHORUS data we can estimate that for the CS scanning method we will have an efficiency of about 50%.



Can Net Scan help?


Z of located vertices
All Located
CS method
Net method
40
35
30
25
20
15
10
5
0
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
mm
Z Vertex


Z of predicted vertices
(located set)
Proc 2
Proc 3
Proc 4
25
20
15
10
5
0
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
mm
Z Vertex


Z Vertex Location
Refit events
Proc 2
Proc 3
Proc 4
14
12
10
8
6
4
2
0
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
mm
Z Vertex